



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------------|-------------|----------------------|---------------------|------------------|
| 10/774,750 | 02/09/2004 | Byong-Gon Lee | 51777/DBP/Y35 | 6143 |
| 23363 | 7590 | 11/27/2006 | EXAMINER | |
| CHRISTIE, PARKER & HALE, LLP | | | SANTIAGO, MARICELI | |
| PO BOX 7068 | | | ART UNIT | PAPER NUMBER |
| PASADENA, CA 91109-7068 | | | 2879 | |

DATE MAILED: 11/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,750

Applicant(s)

LEE ET AL.

Examiner

Mariceli Santiago

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's inquiry and request filed on October 2, 2006, requesting a correction to the office action mailed on September 9, 2006 and a restart in the period of response to the office action, due to error's in the office action cited references, has been reviewed and is found persuasive. Accordingly, below is a corrected version of the office action and the period for response has been restarted from the mailing date of this office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 11 and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Takenaka et al. (US 2002/0036460).

Regarding claim 1, Takenaka discloses a field emission display, comprising a first substrate (10) and a second substrate (12) facing one another and having a predetermined gap therebetween, an electron emission assembly (18) formed on the first substrate for emitting electrons, an illumination assembly (16) formed on the second substrate for displaying images responsive to electrons emitted from the electron emission assembly, and a grid plate (24) mounted between the first and second substrates and configured to focus the electrons emitted

from the electron emission assembly, wherein the grid plate includes protrusions (30a) integrally formed thereon and extending from at least one side thereof (Abstract).

Regarding claim 11, Takenaka discloses a field emission display wherein the illumination assembly comprises an anode electrode, and red, green, and blue phosphor layers formed adjacent to the anode electrode (Paragraph [0082]).

Regarding claim 14, Takenaka discloses a field emission display wherein the grid plate further includes a mask section having apertures through which electrons are passed.

Regarding claim 15, Takenaka discloses a field emission display wherein the protrusions are formed between the apertures formed in the mask section and along one direction to thereby form a stripe pattern (Fig. 14).

Regarding claim 16, Takenaka discloses a field emission display wherein the protrusions are formed between the apertures formed in the mask section and along first and second directions that are substantially perpendicular to each other to thereby form a lattice pattern (Fig. 14).

Regarding claim 17, Takenaka discloses a field emission display wherein the protrusions are formed between at most every other row of the apertures formed in the mask section and along one direction to thereby form a stripe pattern (Fig. 14).

Regarding claim 18, Takenaka discloses a field emission display wherein the protrusions gradually decrease in cross-sectional area in a direction away from the mask section (Fig. 14).

Regarding claim 19, Takenaka discloses a field emission display, comprising a first substrate (10) and a second substrate (12) facing one another and having a predetermined gap therebetween, an electron emission assembly (18) formed on the first substrate for emitting electrons by generating an electric field, an illumination assembly (16) formed on the second substrate for realizing a display of images responsive to electrons emitted from the electron emission assembly, and a grid plate (24) mounted between the first and second substrates and

Art Unit: 2879

configured to focus the electrons emitted from the electron emission assembly, wherein the grid plate includes protrusions extending from at least one side thereof, wherein each of the protrusions has a general shape of an elongated bar (Fig. 2).

Regarding claim 20, Takenaka discloses a field emission display wherein cross-sectional area of the protrusions decreases as the protrusions are traversed from a first end closer to the first substrate to a second end closer to the second substrate.

Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (US 2002/0017875).

Regarding claim 19, Lee discloses a field emission display, comprising a first substrate (8) and a second substrate (10) facing one another and having a predetermined gap therebetween, an electron emission assembly (16) formed on the first substrate for emitting electrons by generating an electric field, an illumination assembly (7) formed on the second substrate for realizing a display of images responsive to electrons emitted from the electron emission assembly, and a grid plate (6) mounted between the first and second substrates and configured to focus the electrons emitted from the electron emission assembly, wherein the grid plate includes protrusions (2, 4) extending from at least one side thereof, wherein each of the protrusions has a general shape of an elongated bar (Fig. 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 6, 9-11 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2002/0017875).

Regarding claim 1, Lee discloses a field emission display, comprising a first substrate (8) and a second substrate (10) facing one another and having a predetermined gap therebetween, an electron emission assembly (16) formed on the first substrate for emitting electrons, an illumination assembly (7) formed on the second substrate for displaying images responsive to electrons emitted from the electron emission assembly, and a grid plate (6) mounted between the first and second substrates and configured to focus the electrons emitted from the electron emission assembly, wherein the grid plate includes protrusions (2, 4) extending from at least one side thereof (Fig. 9). While, Lee fails to exemplify the limitation of the protrusion being integrally formed with the grid plate, it is considered that one skilled in the art would reasonable contemplate the use of a one piece construction instead of the grid plate assembly disclosed by Lee as an obvious matter of engineering choice, *In re Larson* , 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965), since such obvious modification does not solve any of the stated problems or yield any unexpected result that is not within the scope of the teaching applied. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate an integrally made grid plate and protrusion component in the display disclosed by Lee since such modification is considered within the capabilities of one skilled in the art.

Regarding claim 2, Lee discloses a field emission display wherein the electron emission assembly (16) comprises electron emission sources (18) and electrodes for causing the emission of electrons from the electron emission sources, wherein the electrodes include cathode electrodes (16) and gate electrodes (12) formed in a stripe pattern, and wherein the cathode electrodes and the gate electrodes are substantially perpendicular to one another and insulated from one another by an insulation layer (14).

Regarding claim 5, Lee discloses a field emission display wherein the cathode electrodes are formed on the insulation layer (14) over the gate electrodes (12), and the electron emission sources (18) are mounted on the cathode electrodes (16).

Regarding claim 6, Lee discloses a field emission display wherein the protrusions are mounted on the insulation layer (14).

Regarding claims 9 and 10, Lee discloses a field emission display wherein the gate electrodes (12) are formed on the insulation layer (14) over the cathode electrodes (16), and the electron emission sources (18) are mounted on the cathode electrodes (16, Fig. 12), and wherein the protrusions (2) are mounted on the insulation layer (14).

Regarding claim 11, Lee discloses a field emission display wherein the illumination assembly comprises an anode electrode, and red, green, and blue phosphor layers formed adjacent to the anode electrode (Paragraph [0050]).

Regarding claim 13, Lee discloses a field emission display further comprising an auxiliary insulation layer (14) formed on an uppermost layer of the first substrate, and the protrusions (2) are mounted on the auxiliary insulation layer (14).

Regarding claim 14, Lee discloses a field emission display wherein the grid plate further includes a mask section having apertures (6a) through which electrons are passed (Fig. 10).

Regarding claim 15, Lee discloses a field emission display wherein the protrusions are formed between the apertures formed in the mask section and along one direction to thereby form a stripe pattern (Fig. 9).

Regarding claim 16, Lee discloses a field emission display wherein the protrusions are formed between the apertures formed in the mask section and along first and second directions that are substantially perpendicular to each other to thereby form a lattice pattern (Fig. 9).

Regarding claim 17, Lee discloses a field emission display wherein the protrusions are formed between at most every other row of the apertures formed in the mask section and along one direction to thereby form a stripe pattern (Fig. 9).

Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2002/0017875) in view of Takenaka et al. (US 2002/0036460).

Regarding claim 18, Lee '875 fails to disclose the limitation of the protrusions gradually decrease in cross-sectional area in a direction away from the mask section. However, in the same field of endeavor, Takenaka teaches a field emission display provided with a grid plate having a plurality of protrusions, extending from a surface thereof, wherein the protrusions gradually decrease in cross-sectional area in a direction away from the mask section. It has been held that a change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). Thus, it would have been obvious to one having ordinary skill in the art to provide the protrusions which gradually decrease in cross-sectional area in a direction away from the mask section, since such a modification would have involve a mere change in the shape of a component.

Regarding claim 20, Lee fails to disclose the limitation of a cross-sectional area of the protrusions decreases as the protrusions are traversed from a first end closer to the first substrate to a second end closer to the second substrate. However, in the same field of endeavor, Takenaka discloses a field emission display provided with a grid plate comprising protrusions wherein cross-sectional area of the protrusions decreases as the protrusions are traversed from a first end closer to the first substrate to a second end closer to the second substrate. Same rationale for combining as stated in the rejection of claim 18 above applies.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2002/0017875) in view of Russ et al. (US 6,791,278).

Regarding claims 3 and 4, Lee discloses a field emission display wherein the electron emission sources are made of a carbon-based material selected from a group consisting of carbon nanotubes, graphite, diamond, diamond-like carbon and C60 (Fullerene), or a mixture of at least two of the carbon nanotubes, graphite, diamond, diamond-like carbon and C60 (Fullerene) (Paragraph [0039]). Lee is silent in regards to the limitation of the emission source having a substantially uniform thickness. However, in the same field of endeavor, Russ discloses a field emission display provided with electron emission sources deposited in a film having constant thickness in order to produce substantially uniform electron emission (Paragraph 8, lines 44-51). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the electron source uniform thickness disclosed by Russ in the display of Lee in order to produce substantially uniform electron emission.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2002/0017875) in view of Jo et al. (US 6,621,232).

Regarding claims 7 and 8, Lee fails to disclose the limitations of the electron emission assembly further comprises counter electrodes mounted between the cathode electrodes at a predetermined distance from the same, and the counter electrodes are electrically connected to the gate electrodes through via openings formed in the insulation layer such that the counter electrodes are electrically connected to the gate electrodes. However, in the same field of endeavor, Jo discloses a field emission display further comprising an electron emission assembly comprising counter electrodes (14) mounted between the cathode electrodes (10) at a predetermined distance from the same (Fig. 2), and the counter electrodes being electrically

Art Unit: 2879

connected to the gate electrodes through via openings (8a) formed in the insulation layer (8)

such that the counter electrodes are electrically connected to the gate electrodes (6).

Furthermore, Jo acknowledges that when the driving voltage is applied to the gate electrodes (6), additional electric field is formed between the counter electrodes (14) and the emitters (12), in this manner, counter electrodes generate desirable amounts of electron emissions from the emitters. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the counter electrodes disclosed by Jo in the display of Lee in order to generate desirable amounts of electron emissions from the emitters.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2002/0017875) in view of Deguchi et al. (US 6,400,091).

Regarding claim 12, Lee fails to disclose the limitation of the illumination assembly further comprises a metal film formed adjacent to the phosphor layers. However, in the same field of endeavor, Deguchi discloses a field emission display provided with an illumination assembly which further comprises a metal film formed adjacent to the phosphor layers (44, Column 8, lines 61-67) which mirror-reflects a part of the light emitted from the phosphor film, thereby enhancing a light utilization ratio and protects the phosphor film from collision with negative ions. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the metal layer disclosed by Deguchi in the display of Lee in order to mirror-reflect a part of the light emitted from the phosphor film, thereby enhancing a light utilization ratio and protects the phosphor film from collision with negative ions.


Art Unit: 2879

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (571) 272-2464. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Mariceli Santiago
Primary Examiner
Art Unit 2879